

## Sources of financing tangible and financial assets of institutional sectors in the Polish economy in 1995-2012

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**Abstract.** In the context of the last financial crisis, statistics from the financial account as a part of accumulation accounts in SNA become increasingly important for monitoring interconnected financial and real side of the economy. Basic relations in the economy surrounding investment processes, economic growth, structure of the final demand and the position of the financial system, are used to indicate major structural changes relating to the accumulation in the Polish economy in the time period 1995-2012 and to the sources of funding assets. Empirical analysis is based on Klein's flow of funds model (Klein, 2003) using Eurostat database for non-financial and financial annual sector accounts. Special attention is paid to the changes in capital formation and acquisition of financial assets associated with the development of entrepreneurship in Poland in the nineties of the twentieth century as well those connected with the worldwide financial crisis.

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### INTRODUCTION

In terms of the fundamentals of social accounting (Pyatt, 1991), the application of the system of national accounts (SNA'2008 – *System of...*, 2009 and ESA'1995 for European countries – *Manual on Sources...*, 2002) statistics permits to analyse current transactions, distribution of wealth and the corresponding accounting for assets and liabilities, simultaneously. This paper aims at providing a closer look at the interplay of saving, investment and flow of funds by showing the changes in capital expenditures structure by the material and financial accumulation as well as the sources of these expenditures funding. Empirical analysis is based on Eurostat database for non-financial and financial annual sector accounts for Poland and for selected European countries for some comparison.

The SNA presents main macroeconomic categories in a sequence of interrelated current and accumulation accounts recording income flows in the economy. Institutions, assets and transactions are the three main elements of the social accounting. Institutions are units or entities which can own assets (real and financial), incur liabilities and engage in transactions. SNA defines a classification system which groups entities in the economy into five domestic institutional sectors according to their main economic aims:

households, non-financial corporations, general government, financial corporations, non-profit institutions (usually put together with the household sector) and sector for the rest of the world. There are three varieties of transactions among sectors: unrequited transfers (e.g. social security payments, corporate dividends, payments of direct taxes), the sale/purchase of goods and services, flow of funds that is the sale/purchase of financial assets. The latter transactions are the subject of the paper.

Financial transactions concerning acquisition and sale of financial assets as well as the incurrence and repayment of liabilities are represented in the flow of funds accounts (FFA), introduced to social accounting by Keynes (1930, 1936) and later by Copeland (1947, 1949). FFA as a system of accounts, treated as a deterministic macroeconomic model integrated with model of non-financial economy, was the subject of many theoretical and empirical analysis, see e.g. Terzi, 1986; Green, Murinde, 2003; Tsujimura, Tsujimura, 2012. In the above-mentioned literature on the subject, there is a discussion on the possibility of the use of the FF models for monitoring interconnected financial and real side of the economy, which seems to be increasingly important in the context of the last financial crisis (see also Palumbo, Parker, 2009). Some authors even explore the reasons for lack of success at empirical FF modelling, noting the absence of flow of funds data in developing economies (Green, Murinde, 2003) and lack of integration of non-financial and financial accounts in the SNA (e.g. Groon, 2005).

In the paper, FFA are presented as a deterministic model based on the input-output idea (Tsujimura, Mizoshita, 2002; Klein, 2003). First section outlines the basic principles of accumulation accounts in the SNA by institutional sectors. Section 2 focuses on the construction and main assumptions of Klein's flow of funds model. Third section is an empirical analysis of sectoral accumulation and saving structure as well as the sources of financing assets of non-financial institutional sectors in Poland. Last part of the paper summarizes the results of the empirical analysis and suggests some directions for continuing research on FF model applications.

## 1. FLOW OF FUNDS AS A PART OF ACCUMULATION ACCOUNTS OF NON-FINANCIAL INSTITUTIONAL SECTORS

The accumulation accounts include: capital account, financial transactions account, other changes in the volume of assets account and revaluation account. The last three accounts constitute the flow of funds accounts (FFA), see e.g. *Manual on Sources...* (2002), *Monetary and Financial Statistics* (2000). The resources of capital account show sources of funding increase in non-financial assets. Uses are the acquisitions minus the sales of non-financial assets. The balance (resources minus uses) shows if one sector is a net lender, which means that it generates excess resources to finance other sectors' uses or, on the contrary, is a net borrower – its internal resources are insufficient to fund non-financial investment and it needs external financing. Net lending (if it is positive) or net borrowing (if it is negative) is an balancing item of a whole sequence of non-financial accounts in SNA. The net lending/net borrowing is also calculated on the basis of the financial account by subtracting the net increase in liabilities from the net acquisition of financial assets. In that meaning, flow of funds accounts are fully integrated with capital account by saving and non-financial accumulation since in theory, the capital account and financial account measures of net lending/net borrowing should be the same. However, in practice they are almost never equal because of differences in source data, timing of recorded flows and many other reasons for particular sectors (see e.g. Groon, 2005; Abad, 2005; Cagetti et al., 2012). Statistics for many countries show an increasing lack of consistency in the derived relationship between the resources generated by disposable income and borrowing on one hand, and the consumption

and accumulation expenditures on the other, which cause raising value of discrepancy between the non-financial and the financial accounts.

Table 1

## The sequence of accumulation accounts: capital and financial account

Account	Uses	Resources
Capital account (C6) <sup>a</sup>		Gross saving (B8G)
		External balance of goods and services (B11)
	Capital transfers (D9)	
	Gross fixed capital formation (P51)	
	Changes in inventories (P52)	
	Acquisitions less disposals of valuables (P53)	
Net lending(+)/net borrowing(-) (B9)		
Discrepancy with net lending/net borrowing of financial accounts (DB9 = B9 – B9_F)		
Financial account		Net financial transactions (B9_F)
	Net acquisition of financial assets (F_AS_TR)	Net incurrence of financial liabilities (F_LI_TR)
	Monetary gold and special drawing rights (F1)	
	Currency and deposits (F2)	
	Securities other than shares (F3)	
	Loans (F4)	
	Shares and other equity (F5)	
	Insurance technical reserves (F6)	
	Other accounts receivable/payable (F7)	

<sup>a</sup> transactions' codes used by ESA'95 and Eurostat database are shown in brackets

Source: author's elaboration on the basis of ESA'95

Basing on ESA'95 (see Table 1) it is possible to notice the balance equation for sectoral accumulation account including capital and financial account:

$$P51 + P52 + P53 + D9(\text{paid}) + F\_AS\_TR + DB9 = B8G + D9(\text{received}) + F\_LI\_TR \quad (1)$$

The left side of the above equation shows the elements of the sector's assets (plus capital transfers) whereas the right side shows the sources of their funding. Particular institutional sectors are characterised by different structure of accumulation and different kinds of external sources of funding that are available for them. Analysis of financial corporations in the context of flow of funds isn't the scope of this particular research since its complexity. In this paper sector of financial corporations as a subject of analysis is omitted but its important role in financial activity of every sector in the economy is emphasised.

In the case of polish non-financial corporations, resources are: saving, equal to their disposable income (operating surplus and property income less taxes, social contributions and other current transfers), received capital transfers (investment grants from government and EU particularly important for their development after the accession to EU in 2004) and liabilities incurred during the period. Corporations' uses are: gross

capital formation (expenditures that increase the value of fixed assets such as buildings and structures, machinery and equipment, vehicles, etc., intangible assets, repairs of fixed assets, changes in inventories and growth of valuables), paid capital transfers and acquired financial assets. Types of financial assets and liabilities held by non-financial corporations are presented in table 2.

Household sector includes entities of two types: private persons and micro enterprises. Private entities accumulate non-financial assets mainly in the form of residential buildings and valuables (vehicles, machinery and equipment used for private purposes are treated as consumption expenditures). Their capital transfers concern mainly capital taxes. Households resources of accumulation funding are: saving (disposable income less consumption expenditures plus adjustment for the change in net equity of households in pension funds reserves), received capital transfers and incurred liabilities of types shown in table 2. Capital resources and uses of micro enterprises are similar to the ones of non-financial corporations (differences concern special types of financial instruments that are unavailable for micro enterprises).

Accumulation of general government includes mainly infrastructure investments and investments in fixed assets for public use (concerning public administration and defence, education, human health and social work activities, arts, entertainment and recreation), capital transfers (investment grants for enterprises, compensation in cases of natural disasters not covered by insurance services and other transfers) and acquisition of financial assets (see table 2). It is financed by general government's saving (excess of income over public consumption – if exists), capital transfers paid to general government by other sectors and the rest of the world (capital taxes, investment grants, mainly from EU) and incurred liabilities.

Non-profit institutions serving households accumulate gross fixed capital formation and financial assets. These capital uses are financed with saving, capital transfers (mainly investment grants) and loans.

Table 2

Financial assets and liabilities of institutional sectors

Sector	Assets	Liabilities
Non-profit institutions	Currency and deposits, securities (including shares and other equity)	Loans
Households	Currency and deposits, securities (including shares and other equity), loans to other entities, insurance technical reserves, other accounts receivable	Loans, other accounts payable
Non-financial corporations	Currency and deposits, securities (including shares and other equity), loans to other entities, prepayments of insurance premiums and reserves for outstanding claims, other accounts receivable	Securities (issued corporate bonds, shares traded), loans, other accounts payable
General government	Currency and deposits, securities (including shares and other equity), loans to other entities, prepayments of insurance premiums and reserves for outstanding claims, other accounts receivable	Securities other than shares (issued bonds), loans, other accounts payable

Source: author's elaboration on the basis of Eurostat database – Financial flows and stocks

## 2. KLEIN'S FLOW OF FUNDS MODEL

Flow of funds accounts (FFA) can be presented in various forms depending on the analytical needs that are being addressed or on how complex and detailed are the available data. The simplest flow of funds accounts represent financial transactions of major importance among sectors at an aggregated level. Complex

flow of funds accounts consist of three-dimensional matrices presenting financial transactions among source and user sectors and the financial assets used in the transactions. These kinds of matrices show who (which sector) finances whom and by means of which financial assets. FFA that are analysed in this paper are presented in two separate matrices for acquisition of financial assets and incurrence of liabilities by particular institutional sectors. Matrix of financial assets is now marked following Klein (1983, 2003) as  $\mathbf{A}$  and matrix of liabilities is marked by  $\mathbf{L}$ . Thus,  $m \times n$  matrix  $\mathbf{L}$  consists of elements  $l_{ij}$  that mean liabilities of the  $i$ -th form held by the  $j$ -th sector (where  $i = 1, 2, \dots, m$  and  $j = 1, 2, \dots, n$ ). In turn, matrix  $\mathbf{A}$  consists of elements  $a_{ij}$  that mean asset of the  $i$ -th form held by the  $j$ -th sector. Financial transactions shown in matrices  $\mathbf{A}$  and  $\mathbf{L}$  are interrelated with nonfinancial transactions by capital formation and capital transfers which are included in  $s \times n$  matrix  $\mathbf{K}$  consisting of elements  $k_{hj}$ , where  $h = 1, 2, \dots, s$  is the number of category of non-financial asset (or capital transfer).

System of FFA, treated as a deterministic model based on the input-output idea (Klein, 2003; Tsujimura and Mizoshita, 2003), can be written down in a form of equations corresponding to input-output model's idea (Klein 1983, 2003):

$$\mathbf{l} = \mathbf{D}\mathbf{w}^T, \quad (2)$$

$$\mathbf{w} = \mathbf{l}^T \mathbf{C} + \mathbf{k}, \quad (3)$$

where:

$\mathbf{l} = \mathbf{Li}$  –  $m \times 1$  vector consisting of elements  $l_i = \sum_{j=1}^n l_{ij}$  that mean issue of the  $i$ -th liabilities;  $\mathbf{i}$  is summation vector of  $n$  ones,

$\mathbf{k} = \mathbf{iK}$  –  $1 \times n$  vector of elements  $k_j = \sum_{h=1}^s k_{hs}$  that are nonfinancial capital of the  $j$ -th sector;  $\mathbf{i}$  is summation vector of  $s$  ones,

$\mathbf{a} = \mathbf{iA}$  –  $1 \times n$  vector of financial assets;  $\mathbf{i}$  is summation vector of  $m$  ones,

$\mathbf{w} = \mathbf{a} + \mathbf{k}$  –  $1 \times n$  vector of elements  $w_j = a_j + k_j = \sum_{i=1}^m a_{ij} + \sum_{h=1}^s k_{hj}$  meaning changes of total wealth of the  $j$ -th sector (sum of financial and nonfinancial assets by institutional sectors),

$\mathbf{D}$  – matrix of coefficients showing the  $i$ -th liability held by the  $j$ -th sector as a fraction of this sector's total wealth:

$$\mathbf{D}_{m \times n} = [d_{ij}], \quad d_{ij} = l_{ij} / w_j \quad (4)$$

$\mathbf{C}$  – matrix of coefficients representing the  $j$ -th sector's holding of the  $i$ -th financial asset as a fraction of total issue of liabilities of the  $i$ -th form:

$$\mathbf{C}_{m \times n} = [c_{ij}], \quad c_{ij} = a_{ij} / l_i, \quad (5)$$

$^T$  means transposition.

Changes in main variables of Klein's FF model are then used to identify major structural changes in Poland in the period 1995-2012 (divided into six three-year sub-periods) that concern respectively:

- i. capital expenditures that make up the total wealth of institutional sectors (elements of vector  $\mathbf{w}$ ),
- ii. external sources of financing capital uses (elements of matrix  $\mathbf{D}$ ),
- iii. the role of particular sectors (creditors) in funding other sectors' (debtors) activity (elements of matrix  $\mathbf{C}$ ).

### 3. CHANGES IN CAPITAL RESOURCES AND USES IN POLAND

#### 3.1. Accumulation structure and its sources by institutional sectors

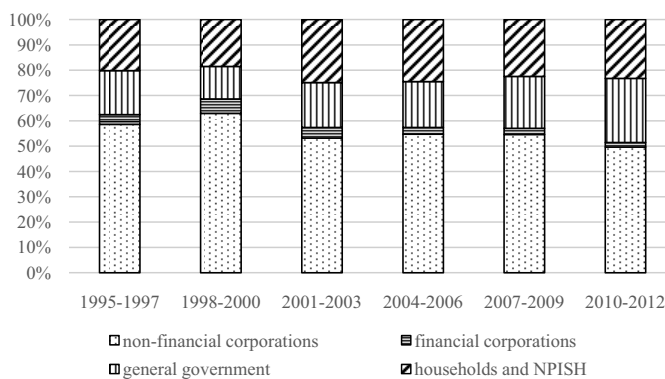
The analysis of sources of investment (accumulation) financing in Poland in the years 1995-2012, including the degree of self-financing, indicates significant role of domestic saving in financing investment activities. Empirical studies of the relationship between investment and saving were led, inter alia by: Feldstein and Horioka (1980), Feldstein and Bacchetta (1991), Jakubiak (1999), Levy (2000). A strong positive correlation between investment and domestic saving in most countries may result, among others, from the limitations in the foreign trade balance and therefore, imperfect capital mobility (Dornbush 1991). The presence of such a strong dependence may indicate that domestic saving determines the accumulation, and insufficient stream of saving may be an important constraint for investment despite the rising free movement of capital in the current era of globalization (Feldstein, Bacchetta 1991). However, Jansen (1996) have already negated the effectiveness of capital mobility studies using the correlation between saving and investment, noting the cointegration of these economic categories over time, and therefore the need to distinguish the short- and long-term effects.

The relationship between accumulation and saving of each institutional sector is much weaker than in the total economy, as capital expenditures (mainly investments) of entities were financed from their own sources (saving of the sector) only in part. Capital expenditures were financed with lending (financial saving) accumulated in the financial system.

The level and structure of accumulation/investments (material/tangible and financial) of particular institutional sectors depends largely on the underlying purpose of their activity. The most of non-financial investments in the Polish economy, key to the economic growth, are the investments of non-financial corporations (see Figure 1), which are indispensable for the main objective of their business - profit maximization. In the last years of the analysed period (1995-2012) the decline in the participation of non-financial corporations in material investments was observed. This was a consequence of the global financial crisis, the real reflection of which was seen in Poland mainly in the decline in GDP growth, especially in the fall of the corporations' investment demand.

Due to the structural changes associated with the growing number of micro-enterprises, which required the capital expenditures for their establishment and development, an increase in the share of the households' investments in domestic investments was observed. Simultaneously, individuals' expenditures on the purchase of real estate grew.

Investments of general government are public. Their volume depends on many factors, such as the political situation in the country, the international situation, etc., which were strongly differentiated in each year of the period 1995-2012. In the last years of the period the vast increase in the material investments, especially in infrastructure mainly due to UEFA EURO 2012 as a driving force, was observed.



**Figure 1. Non-financial accumulation structure**

Source: author's own elaboration

The value of financial investments is recorded in the financial account as the net acquisition of financial assets. Net means that this position of financial accounts consist of transactions relating to acquisitions and disposals of financial assets, the difference between them is usually positive, but it can also be negative if the value of the assets sold was higher than acquired (as in the case of the government). This fact makes it difficult for the formal reasons to analyse the structure of financial investments on the basis of shares (indicators of structure). Among the non-financial sectors the biggest financial investments are borne by households, whereas a growing share of non-financial corporations can be noticed.

At the macroeconomic level, the accumulation is financed mainly from domestic saving. The excess of investment over domestic saving means that to cover the investment costs incurred by domestic entities external financing - foreign capital inflows was needed, which caused the net borrowing between Poland and abroad in the years 1996-2012.

Changes in the structure of saving by institutional sectors, that were observed in the period 1995-2012, show the decreasing role of households with increasing importance of non-financial corporations in the creation of domestic saving (see Figure 2). It should be noted that the data on saving in the SNA show annual changes in the stock of saving, it is possible, therefore, that the stream of saving is negative in a given year when current expenditures exceed disposable income. In this case, in order to finance current expenditure the assets are sold or the liabilities are incurred - as in the case of the polish general government in 1995, 2000-2005, 2009-2012.

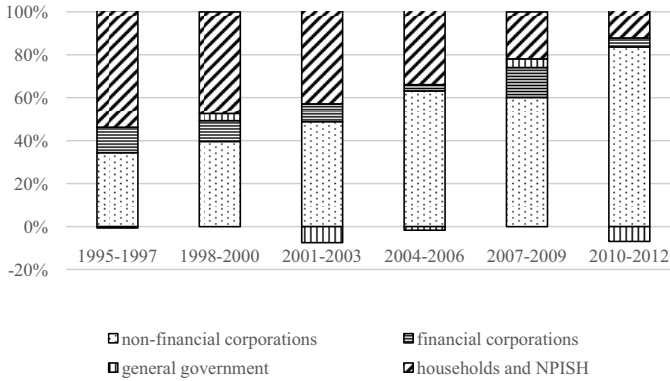


Figure 2. Sectoral gross saving structure  
Source: author's own elaboration

Determinants of changes in the structure of the accumulation of particular institutional sectors (non-financial) as well as the sources of its funding are presented in the following sections.

### 3.2. Non-financial corporations' accumulation

Changes in the structure of non-financial corporations' capital expenditures are, on one hand, the result of the analysis of the real economy (supply and demand), which determines the demand for material investment. On the other hand, entrepreneurs take into account the situation on the financial markets, which in turn determines the demand for financial investment. An example of investors' reaction to the position of financial markets was the decline in the share of financial investments in capital expenditures in 2008 and 2009 in response to the global financial crisis (see Table 2). The decline in interest in the acquisition of shares and other equity was particularly important. On the financial account - changes in assets, it was recorded as a negative value of the transactions related to this kind of financial instrument, which meant that the value of the resold shares was higher than the value of the purchased shares during the period. The improvement in the capital markets and the simultaneous lack of long-term growth expectations for consumer demand resulted in an increase in the share of financial investment in capital expenditures for the forthcoming period 2010-2012 (see Table 3).

The decreasing corporations' share in tangible accumulation in the economy (see Figure 1), with increase in their participation in the creation of domestic saving (see Figure 2) indicates that the sector of non-financial corporations has increased its role in financing investment activity of all sectors, whose own funds are insufficient (saving is lower than accumulation). This conclusion is confirmed by changes in the coefficients of the matrix **C** in Klein's flow of funds model (see equation 3 and 5). Table 2 contains column of matrix **C** for the subsequent periods, corresponding to the non-financial corporations.



Table 3

## Non-financial corporations' accumulation structure

Specification	1995-1997	1998-2000	2001-2003	2004-2006	2007-2009	2010-2012
Real investment (P5)	0,687	0,864	0,831	0,592	0,666	0,575
Capital transfers (D9)	0,002	0,005	0,010	0,013	0,008	0,011
Financial investment (F_AS_TR+DB9)	0,311	0,132	0,159	0,395	0,327	0,414

Note: Due to the problem of balancing the resources and uses on account of accumulation (capital and financial) resulting in a discrepancy with net lending/net borrowing of financial accounts (DB9) financial assets of corporations have been corrected. According to the sources of discrepancy concerning corporations sector commented in the literature (e.g. Abad, 2005) in the predominant period increase in the value of assets was necessary, as capital expenditures were lower than revenues (before the introduction of correcting position).

Source: author's own compilation

Table 4

Elements of matrix **C** (see equation 5) for non-financial corporations

Financial asset		1995-1997	1998-2000	2001-2003	2004-2006	2007-2009	2010-2012
Currency and deposits	F2	0,149	0,136	0,310	0,368	0,146	0,128
Securities other than shares	F3	0,085	-0,029	0,047	0,024	0,025	0,054
Loans	F4	-0,018	-0,001	0,022	0,049	0,036	0,123
Shares and other equity	F5	-0,008	<b>0,045</b>	0,061	0,050	0,206	<b>0,218</b>
Technical reserves	F6	0,059	0,152	0,119	0,037	0,038	0,102
Other	F7	0,288	0,145	0,408	0,659	0,083	0,360

Source: author's own compilation

It is visible that non-financial corporations grew their assets in the form of securities other than shares, loans to other sectors and shares and other equity, especially during the economic slowdown in the time period 2010-2012. For example, an increase in the coefficient  $c_{ij}$  relating to corporations' shares and other equity with an average of 0,045 in 1998-2000 to 0,218 in 2010-2012, indicates that in the latter period liabilities of all sectors in the form of F5 were financed by corporations in 21.8% (according to the principle of that each liability of one sector must be the claim of another), while in 1998-2000 this percentage was only 4.5%.

Insurance behaviour of corporations (meaning reduced tendency to physical investment) is also visible in the decline in assets financing with debt (basically in any form of liabilities - see table 3 and the relation of net incurrence of liabilities to accumulation - see Figure 3) with increasing degree of investment self-financing as the ratio of gross saving to accumulation and relatively stable degree of funding it with capital transfers (see Figure 3).

Table 5

Elements of matrix **D** (see equation 4) for non-financial corporations

Form of liability <sup>1</sup>		1995-1997	1998-2000	2001-2003	2004-2006	2007-2009	2010-2012
Securities other than shares	F3	0,003	0,041	-0,008	0,010	0,006	0,027
Loans	F4	0,201	0,197	0,093	0,108	0,181	0,099
Shares and other equity	F5	0,081	0,064	0,111	0,164	0,126	0,022
Other	F7	0,287	0,225	0,080	0,112	0,056	0,033

<sup>1</sup> only for non-zero elements

Source: author's own compilation

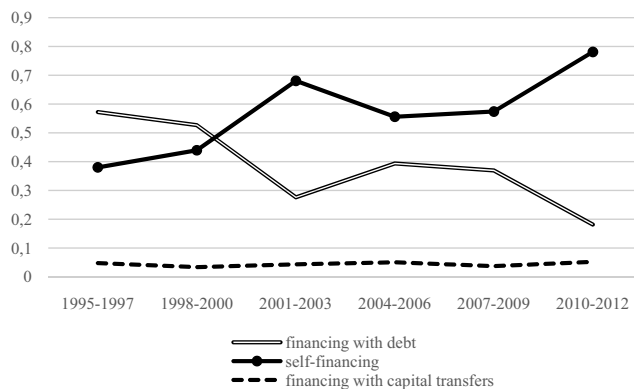


Figure 3. Corporations' accumulation financing

Source: author's own elaboration

### 3.3. Households and NPISH

On financial accounts the data for households are published in conjunction with sector of non-profit institutions serving households (NPISH). Non-financial accounts show that the importance of NPISH in the economy is marginal (in the time period 1995-2012 its participation in the creation of saving did not exceed 2.3% and of gross fixed capital formation - 0.2% - see Eurostat database). Therefore, an attempt to analyse changes in the structure and accumulation funding sources focuses on households.

The primary role of households in the economy is to generate consumer demand and the accumulation of saving (mainly in the form of currency and deposits - see Table 4). Wherein the reversal of the relationship between the accumulation of the sector and its saving is clearly visible (see figure 4). By 2006, gross saving exceeded non-financial accumulation, followed by a clearly visible increase in gross fixed capital formation - especially connected with the purchase of residential property financed with long-term loans. While in the years 1995-1997 the change of households' assets (tangible and financial) was on average in 13% funded with incurred liabilities (in 8.4% with long-term loans), in the period 2007-2009 the share of funding assets with debt exceeded 57% (53.7% with long-term loans). In the last of the analysed sub-periods the average rate of households' net borrowing decreased from 30.2% in 2007-2009 to 8.5% in 2010-2012 (calculated on the basis of Eurostat database) in response to the global financial crisis. However, in many European countries - in Ireland, Bulgaria, Estonia, Greece, Spain, Latvia, Lithuania, Hungary, and the United States

(Financial Accounts of the United States, 2014) a negative rate of change in the stock of households loans was observed. With the increasing degree of assets financing with debt and capital transfers (including investments grants since 2004) of households in Poland the degree of self-financing (funding from saving) decreased.

Table 6

Elements of matrix **C** (see equation 5) for households and NPISH

Financial asset		1995-1997	1998-2000	2001-2003	2004-2006	2007-2009	2010-2012
Currency and deposits	F2	0,723	0,621	0,682	0,313	0,668	0,785
Securities other than shares	F3	0,023	-0,020	0,031	-0,013	-0,011	0,004
Loans	F4	0,000	0,000	0,001	0,017	0,002	-0,002
Shares and other equity	F5	0,239	0,167	0,509	0,400	-0,405	0,187
Technical reserves	F6	0,937	0,838	0,879	0,959	0,949	0,857
Other	F7	0,105	0,120	-0,183	-0,023	0,127	0,022

Source: author's own compilation

Table 7

Sources of households and NPISH accumulation funding

Specification		1995-1997	1998-2000	2001-2003	2004-2006	2007-2009	2010-2012
Accumulation financing with liabilities		0,130	0,153	0,112	0,365	0,577	0,395
Of which:							
Short-term loans	F41	0,031	0,045	0,014	0,020	0,040	-0,014
Long-term loans	F42	0,084	0,085	0,108	0,329	0,537	0,402
Other accounts	F7	0,015	0,023	-0,010	0,016	0,000	0,006
Self-financing		0,865	0,832	0,855	0,612	0,387	0,544
Financing with capital transfers		0,005	0,014	0,033	0,022	0,037	0,050

Source: author's own compilation

In addition, it is worth noting that since 1998 (in connection with the reform of the pension system) household saving is twofold. Firstly, saving that results from implementation of the propensity to save - postponement of consumption over time (here named for Liberda (2013) as voluntary saving), but also the change in net equity of households in pension funds reserve that entered through an adjustment to the use of adjusted disposable income account, which increases households gross saving. Figure 4 clearly shows the growing share of retirement saving in gross saving of this sector (see also Trębska, 2013) due to the level of contributions paid to pension funds that grew until 2012, when still a small sum of pension benefits was paid by pension funds. Accordingly, fluctuations in the degree of accumulation self-financing (see Table 4) are not only the result of changes of propensity to consume/save, but to some extent also the result of the accounting records changes made in the form of adjustment for the change in equity of households in pension funds reserves. For example, the decrease in the average degree of accumulation self-financing in 2007-2009 (especially significant drop to 0,172 in 2008) was a consequence of a reduction in households' gross saving due to negative valuation of pension fund assets in connection with declines in share prices on the stock market.

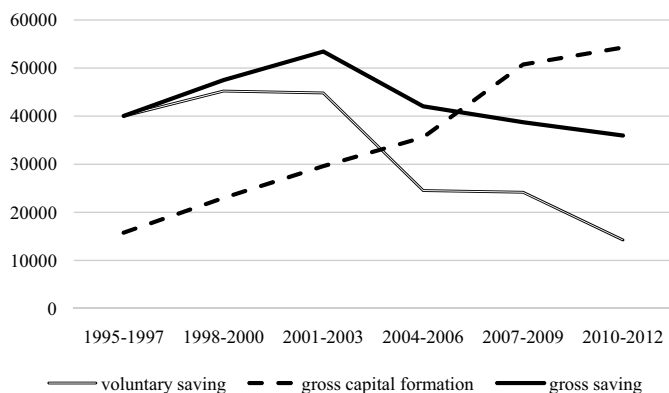


Figure 4. Saving and tangible accumulation of households and NPISH

Source: author's own elaboration

### 3.4. General government

Usually the situation of the general government is evaluated by the use of indicators such as the budget deficit and public debt in relation to GDP. The highest deficit was recorded in 2003 - 6.2%, in 2009-2012 it was respectively 7.5% and 7.9% of GDP. These indicators are correlated with the degree of accumulation financing with debt. The liabilities incurred by general government are used both to finance accumulation and current expenditure (as in the case of households). The increase in accumulation funding with debt (primarily through the issuance of securities other than shares) in 2001-2003 is clearly visible. While negative indicator for accumulation self-financing, which, with a little sense of capital transfers in this period, meant that the value of general government liabilities was higher than the growth in wealth and, therefore, in the case of current expenditures exceeding income (negative streams of saving), it was necessary to finance them with debt. Again, in the period (2009) 2010-2012 current expenditures exceeded revenues, however, capital transfers (mainly investment grants from the EU, which in 2006-2012 grew at an annualized rate of 31%) became an important source of accumulation financing.

Table 6

Sources of general government accumulation funding

Specification		1995-1997	1998-2000	2001-2003	2004-2006	2007-2009	2010-2012
Accumulation financing with liabilities		0,823	0,751	1,367	0,966	0,780	0,911
Of which:							
securities other than shares	F3	0,484	0,608	1,449	1,253	0,664	0,619
loans	F4	-0,056	-0,204	-0,118	-0,329	0,058	0,249
other accounts	F7	0,395	0,346	0,037	0,043	0,058	0,043
Self-financing		-0,020	0,265	-0,369	-0,060	0,129	-0,220
Financing with capital transfers		0,197	-0,016	0,001	0,094	0,091	0,271

Source: author's own compilation

## CONCLUSIONS AND SOME EXTENSIONS

The historical analysis of matrices **C** and **D** in the Klein's model (see equation 2 and 3) and some of its extensions enabled the identification of major structural changes relating to the accumulation in the Polish economy and to the sources of its funding. The following observations deserve special attention.

- i. The growing share of non-financial corporate sector in both disposable income, as well as gross saving in the economy, net lending since 2009 (according to non-financial accounts), while in earlier years, this sector was characterized by net borrowing. These facts are reflected in the coefficients of matrices **D** and **C** in the decrease in accumulation funding with debt and increasing role of this sector in the financing of the other sectors' debt, particularly concerning financial instruments that require professional knowledge of managerial staff. The last conclusion confirms the importance of financial literacy in effective management of funds widely discussed in the literature (e.g. Jappelli, Padula, 2011).
- ii. Changing the structure of households accumulation, increasing role of this sector in the gross fixed capital formation in the economy and a significant increase in the degree of accumulation funding with debt, resulting, inter alia, with strongly growing small business in the 90s of the twentieth century. Moreover, decreasing households propensity to save stemmed from their predictions of permanent increase in disposable income and their desire to increase their standard of living, for example by improving housing conditions, thereby increasing the tangible accumulation.
- iii. General government accumulation is financed primarily with debt in the form of securities other than shares, increasing level of liabilities is visible in the growth of public debt from 36.8% in 2000 to 55.6% of GDP in 2012, but this rate is much lower in Poland than in other European countries (in Ireland, Greece, Italy, Portugal it exceeds 115% of GDP, in most EU countries it exceeds 80% of GDP).

Klein's model enables the analysis of FFA in the context of forecasting the demand for money, the implementation of which is the net incurrence of liabilities, and the supply of money in the form of net acquisition of financial assets for a given amount of investment demand and saving in the economy. Simple transformation of equations 2 and 3 allows to determine the vectors **l** (liabilities), **a** (financial assets) and **w** (non-financial and financial accumulation) as a function of tangible accumulation (see Klein, 1983, 2003) and some empirical applications for European countries in 2010 e.g. Tomaszewicz and Trębska, 2013).

Another way of presenting FFA, especially in a form of *from-whom-to-whom* financial accounts (Mink, 2005; Tsujimura, Tsujimura, 2012) will make it possible to conduct a more in-depth study of intersectoral financial flows and the role of financial institutions in the economy, particularly in channelling private saving into productive investments.

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